

**Claims**

1. A method for welding an end of a polygonal hollow section (PHS) to a member comprising the step of forming a weld across a surface of the PHS, the weld extending continuously from a connection weld connecting the PHS and the member to a location remote from the connection weld.
- 5 2. A method as claimed in claim 1 wherein the surface of the PHS is one or more flanges of the PHS.
- 10 3. A method as claimed in claim 2 wherein the PHS is an RHS or SHS, and the surface is part of just one flange.
4. A method as claimed in claim 2 wherein the continuous weld is applied to a tensile flange or flanges of the PHS.
- 15 5. A method as claimed in claim 1 wherein the continuous weld is formed by applying a plurality of weld beads to the surface.
6. A method as claimed in claim 1 wherein the step of forming the continuous weld comprises the steps of:
  - applying the connection weld across an edge of a flange of the PHS at the end thereof to connect the PHS to the member;
  - 20 applying a weld bead across the flange that is spaced from the connection weld bead;
  - applying one or more intermediate weld beads to the flange so as to define the continuous weld between the connection and spaced weld beads.
- 25 7. A method as claimed in claim 6 wherein the PHS is an RHS or SHS, and one flange defines a tensile flange, such that the weld beads are transversely applied only across the tensile flange.
- 30 8. A method as claimed in claim 6 wherein the weld beads are applied in either a backward or forward bead deposit sequence; wherein in the forward bead deposit sequence one or more successive intermediate weld beads are applied to the flange, starting adjacent to the connection weld bead,
- 35 to then progressively define the continuous weld, with the final weld bead then constituting the spaced weld bead; and wherein in the backward bead deposit sequence, before

or after applying the connection weld bead, a spaced weld bead is applied, and one or more successive intermediate weld beads are then applied, starting from adjacent to the spaced weld bead and progressing until the connection weld 5 bead is reached, thereby defining the continuous weld.

9. A method as claimed in claim 8, when used to connect an RHS or SHS to the member, wherein after forming a connection weld between the RHS/SHS and the member, the spaced weld bead is applied, and then two or more 10 intermediate weld beads are applied in succession between the spaced weld bead and the connection weld, starting with the first intermediate weld bead adjacent to the spaced weld bead.

10. A method as claimed in claim 6 wherein an additional 15 weld bead is applied in a region defined between the member, the connection weld and that intermediate weld bead immediately adjacent to the connection weld.

11. A method as claimed in claim 10 wherein the additional weld bead has a thickness that is at least 0.5 times the 20 flange thickness.

12. A method as claimed in claim 6 wherein the connection weld is applied as one or more bead passes right around the peripheral end of the PHS to fully connect that end to the member.

25 13. A method as claimed in claim 6 wherein the combined weld beads have a width ranging from 10 to 30 mm.

14. A method as claimed in claim 6 wherein the weld beads each have a thickness that is in the range of 0.3 to 0.6 times the adjacent flange thickness.

30 15. A method as claimed in claim 1 wherein the member is another PHS, a supporting plate, a stiffening plate, a connecting plate, a base plate or a top plate.

16. A method as claimed in claim 1 wherein the PHS and the member define a joint about which a bending moment can be 35 applied, as a result of a load applied to the PHS, or to the member, or both.

17. A method for increasing the rotation capacity in a

welded moment connection between a PHS and a member comprising the step of forming a weld between the PHS and the member in a manner such that strain in corner(s) of the PHS, located at an end of the PHS that is weld 5 connected to the member, is redistributed to an adjacent flange of the PHS.

18. A method for increasing the rotation capacity in a welded moment connection between a PHS and a member comprising the step of forming a weld between the PHS and 10 the member in a manner that minimises the extent to which a heat effected zone through a flange of the PHS lies in a fracture zone adjacent to an internal end of the weld.

19. A method as defined in claim 1 that is applied to steel having reduced elongation at fracture when compared 15 to a corresponding hot-formed steel section.

20. A method as claimed in claim 19 wherein the steel is cold-formed and is susceptible to fracture in a heat affected zone adjacent to where the PHS is joined to the member.